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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/533,066	04/28/2005	Keiji Iwamoto	63286(46342)	5897

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EXAMINER	
DANG, IAN D	

ART UNIT	PAPER NUMBER
1647	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/533,066	IWAMOTO ET AL.	
	Examiner	Art Unit	
	Ian Dang	1647	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *24 September 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *22 and 49* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *22 and 49* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *09/24/2007* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☒ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Status of Application, Amendments and/or Claims

The amendment of 24 September 2007 has been entered in full. Claims 1-21 and 23-48 have been cancelled and claim 22 has been amended. Claim 49 has been added.

Applicant is reminded that in the communication filed of 04/26/2007, Applicant elected Group V, claims 22-23, and further elected SEQ ID NO:1.

Claims 22 and 49 are pending and under examination as they read upon the elected invention of SEQ ID NO:1.

Specification

Applicant's amendments filed on 09/24/2007 have overcome the objection regarding the title of the application. The objection to the title has been withdrawn.

35 USC § 112, Second Paragraph

Applicant's response and amendments made to claim 22 and the cancellation of claim 23 filed on 09/24/2007 have overcome the rejection of claims 22 and 23 under 35 USC 112, Second paragraph. The rejection of claims 22 and 23 under 35 USC 112, Second paragraph has been withdrawn.

35 USC § 112, First Paragraph (Written Description and Enablement)

Applicant's cancellation of claim 23 filed on 09/24/2007 have overcome the rejection of claim 23 under 35 USC 112, First paragraph. The rejection of claim 23 under 35 USC 112, first paragraph has been withdrawn.

35 USC § 102

Applicant's cancellation of claim 23 filed on 09/24/2007 have overcome the rejections of claim 23 under 35 USC 102 (b) 102 (e) has been withdrawn.

Applicant's response, amendments made to claim 22 filed on 09/24/2007 have overcome the rejection of claim 22 under 35 USC 102 (e). Hsu et al. do not teach the steps of determining the glucose uptake activity of a cell capable of producing the homolog and the glucose uptake activity of a mixture of a cell capable of producing the homolog and comparing the glucose uptake activity between these cells. The rejection of claim 22 under 35 USC 102 (e) has been withdrawn.

Drawings

The Examiner acknowledges Applicant's submission of Figure 3 filed 9/24/07. However, the drawing for Figure 3 filed 09/24/2007 is objected to because each of the panels is still black. The Examiner is unable to discern the data represented therein. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be

labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112 (Written Description)

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 22 and 49 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The basis of this rejection is set forth for claims 22 and 23 at page 3 of the previous Office action of 29 June 2007.

The rejection of claim 22 and the newly added claim 49 is maintained. Applicant's response and arguments filed on 09/24/2007 have been fully considered but they are not persuasive.

Applicant argues that the claims have been amended such that the SGLT homolog is limited to a protein which comprises the amino acid sequence represented by SEQ ID NO:1 or having an amino acid sequence having at least about 90% homology to the amino acid sequence represented by SEQ ID NO:1, its partial peptide, or a salt thereof. Furthermore, the claimed method has been amended to recite specific steps

Applicant's claim amendments have been fully considered but are not found persuasive. The amendments of claim 22 do not satisfy the written description requirement because the claim language "...an amino acid sequence having at least about 90% homology to the amino acid sequence represented by SEQ ID NO: 1, ...its partial peptide, or a salt thereof" has been broadly interpreted by the Examiner as encompassing any variants, fragments and mutants of the SGLT homolog of SEQ ID NO: 1.

To provide adequate written description and evidence of possession of claimed genus, the specification must provide efficient distinguishing identifying characteristics of the genus. The factors to be considered include disclosure of complete or partial structure/function correlation, and other identifying characteristics. Accordingly, in the absence of sufficient recitation of distinguishing structural/physical and identifying characteristics, the specification does not provide adequate written description of the claimed genus.

Applicant recites general characteristics regarding a "Na+/glucose transporter (SGLT) homolog" without any sufficient recitation of distinguishing structural/physical and identifying characteristics of an amino acid sequence having at least about 90% homology to the amino acid sequence represented by SEQ ID NO:1 or fragments thereof. For instance, the claims do not disclose any identifying structural or functional characteristics of a SGLT homolog having at least about 90% homology to the amino acid sequence represented by SEQ ID NO:1 or its partial peptide. While Applicant discloses the general functional characteristics of a SGLT homolog, Applicant has not provided any specific identifying structural characteristics so that one skilled in the art can correlate a SGLT homolog having at least about 90% homology to the amino acid sequence represented by SEQ ID NO:1 or its partial peptide with a distinct biological function. At page 8, the specification teaches that the Na+/glucose transporter (SGLT) homologs may be any protein derived from any cells of human and warm-blooded animals ...

(page 8 lines 23-25). However, the specification does not teach any variants of a SGLT homolog having at least about 90% homology to the amino acid sequence represented by SEQ ID NO:1 or fragments thereof that can regulate glucose uptake activity. At page 8, the specification does not provide sufficient teachings correlating the structure of a variant of a SGLT homolog with its biological function, so that one skill in the art can identify the claimed SGLT homolog of the instant application.

There is no description of the conserved regions, which are critical to the structure and function of the genus claimed. There is no description of the sites at which variability may be tolerated and there is no information regarding the relation of structure to function. Furthermore, the prior art does not provide compensatory structural or correlative teachings sufficient to enable one of skill to isolate and identify the variants of SGLT homolog having at least about 90% homology to the amino acid sequence represented by SEQ ID NO:1 or fragments thereof encompassed by the claims. Thus, no identifying characteristics or properties of the instant variants, fragments, and mutants of the isolated protein consisting of a SGLT homolog having at least about 90% homology to the amino acid sequence represented by SEQ ID NO:1 are provided such that one of skill would be able to predictably identify the encompassed molecules as being identical to those instantly claimed. One of skill in the art would reasonably conclude that the disclosure fails to provide a representative number of species to describe the genus. Thus, applicant was not in possession of the claimed genus.

Additionally, the broad brush discussion of making and screening for variants does not constitute a disclosure of a representative number of members. No such variants were made or shown to have activity. Only the polypeptide of SEQ ID NO:1 is disclosed. The specification's general discussion of making and screening for variants constitutes an invitation to experiment by trial and error. Such does not constitute an adequate written description for the claimed

variants. The specification does not provide any disclosure regarding the number of amino acid changes, the identities of the amino acids and the location of these changes for the claimed polypeptide variants while still retaining a biological function.

Claim Rejections - 35 USC § 112 (Enablement)

Claims 22 and 49 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for a method of screening a compound that suppresses the glucose uptake activity of the SGLT homolog comprising the amino acid sequence of SEQ ID NO:1, does not reasonably provide enablement for a method of screening a compound that regulates the glucose uptake activity of a Na+/glucose transporter (SGLT) homolog or a protein comprising the same of substantially the same amino acid sequence as the amino acid sequence represented by SEQ ID NO:1 in the small intestine comprising the homolog. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make/use the invention commensurate in scope with these claims. The basis of this rejection is set forth for claims 22 and 23 at page 6 of the previous Office action of 29 June 2007.

The rejection of claim 22 and the newly added claim 49 is maintained. Applicant's response and arguments filed on 09/24/2007 have been fully considered but they are not persuasive.

Applicant's claim amendments have been fully considered but are not found persuasive. The amendments of claim 22 do not satisfy the enablement requirement because the claimed method requires undue experimentation.

As disclosed above and at page 8 of the Office action mailed 06/29/2007, the invention is broad because the recitation of claim 22 encompasses a large number of polypeptides.

Specifically, the Examiner has broadly interpreted the recitation in claim 22 of "...an amino acid sequence having at least about 90% homology to the amino acid sequence represented by SEQ ID NO: 1, ...its partial peptide, or a salt thereof" as encompassing any variants, fragments and mutants of the SGLT homolog of SEQ ID NO: 1. It would require undue experimentation by one skilled in the art to be able to practice the invention commensurate in scope with the claims because the claims are broadly drawn to a method comprising the variants and fragments of a SGLT homolog having at least about 90% homology to the amino acid sequence represented by SEQ ID NO:1.

In addition, it would require undue experimentation for one of skill in the art to be able to screen a compound or its salt that regulates the glucose uptake activity of a Na^+/glucose transporter (SGLT) homolog in the small intestine without sufficient disclosure in the specification regarding the functional characteristics of a SGLT homolog having at least about 90% homology to the amino acid sequence represented by SEQ ID NO:1 and fragments thereof.

Finally, it would require undue experimentation for one of skill in the art to be able to screen a compound that regulates the glucose uptake activity of a Na+/glucose transporter (SGLT) homolog having at least about 90% homology to the amino acid sequence represented by SEQ ID NO:1. Although Applicant has provided guidance regarding the polypeptide of SEQ NO:1 (page 9, lines 6-15), the specification does not teach any polypeptide variants at least 90% identical to SEQ ID NO:1 or fragments thereof required in order to maintain its biological activity as a glucose transporter. In addition, the specification does not provide any disclosure regarding the number of amino acids changes, the identities of the amino acids and the location of these changes for the claimed polypeptide variants while still retaining a biological function. It is well known in the art that certain amino acid positions in the sequence are critical to the

proteins structure/function relationship, e.g. such as various sites or regions directly involved in binding, activity and in providing the three-dimensional spatial orientation of binding and active sites (see for example, Wells, 1990, Biochemistry 29:8509-8517; Ngo et al., 1994, The Protein Folding Problem and Tertiary Structure Prediction, pp. 492-495; Bork, 2000, Genome Research 10:398-400; Skolnick et al., 2000, Trends in Biotech. 18(1):34-39, especially p. 36 at Box 2; Doerks et al., 1998, Trends in Genetics 14:248-250; Smith et al., 1997, Nature Biotechnology 15:1222-1223; Brenner, 1999, Trends in Genetics 15:132-133; Bork et al., 1996, Trends in Genetics 12:425-427).

Due to the large quantity of experimentation necessary to generate the infinite number of derivatives recited in the claims and possibly screen same for activity, the lack of direction/guidance presented in the specification regarding which structural features are required in order to provide activity, the absence of working examples directed to same, the complex nature of the invention, the state of the prior art which establishes the unpredictability of the effects of mutation on protein structure and function, and the breadth of the claims which fail to recite any structural or functional limitations, undue experimentation would be required of the skilled artisan to make and/or use the claimed invention in its full scope.

In view of these teachings in the art and the limited guidance provided in the specification, a method of screening a compound that suppresses the glucose uptake activity of SGLT homolog of SEQ ID NO:1 is not predictable for a method of screening a compound that regulates the glucose uptake activity of a Na+/glucose transporter (SGLT) homolog or a protein comprising the same of substantially the same amino acid sequence as the amino acid sequence represented by SEQ ID NO:1 in the small intestine comprising the homolog.

Claim Rejections - 35 USC § 112, Second paragraph

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 22 and 49 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicants regards as the invention.

Although Applicants have overcome the previous rejection under 35 USC 112, 2nd paragraph by amending claim 22, the amendments made to claim 22 and the addition of claim 49 have raised new issues under 35 USC 112, 2nd paragraph.

a. The phrase "a cell capable of producing the homolog" in claim 22, line 4 is a relative term which renders claim 22 indefinite. The term "a cell capable of producing the homolog" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. For instance, it is not clear that the homolog is definitely expressed by the cell. (Please note that this issue could be overcome by amending the claim to recite, for example, "...a cell expressing the homolog...".

b. The phrase "a mixture of cell capable of producing the homolog and a test compound" in claim 22, lines 5-6 is a relative term which renders claim 22 indefinite. The term "a mixture of cell capable of producing the homolog and a test compound" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. For instance, it is not clear if the homolog and the test compound are both being expressed by the cell or if the compound is added to a cell expressing the homolog. (Please note that this issue

could be overcome by amending the claim to recite, for example, "...a cell expressing the homolog in the presence of a test compound...".)

c. The term "cases" in claims 22 and 49 is a relative term which renders the claims 22 and 49 indefinite. The term "cases" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. For instance, it is not clear as to what is encompassed by the recitation of cases. Is the term "cases" intended to mean "steps"?

d. Claims 22 and 49 are indefinite because the claims have a step that does not clearly relate back to the preamble. For example, the preamble of claim 22 recites "a method of screening a compound or its salt that regulates the glucose uptake activity of a Na^+/glucose transporter (SGLT) homolog in the small intestine". However, there is no step in the body of the claim indicating that the regulation of the glucose uptake activity of a Na^+/glucose transporter has taken place.

e. Claim 49 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. For instance, it is not clear as to how the measurements for the accumulation of glucose analogs are determined in the claimed method. Lines 3-4 of claim 49 are particularly confusing. For example, it is not clear if radioactivity is being measured or the presence of the accumulated analogs.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 22 and 49 are rejected under 35 U.S.C. 102(b) as being anticipated by Iwamoto et al. (WO 02/053738; priority to the publication date of July 11, 2002, cited in the IDS filed 04/28/2005). The basis of this rejection is set forth for claims 22 and 23 at page 14 of the previous Office action of 29 June 2007.

The rejection of claim 22 and the newly added claim 49 under 35 USC 102 (b) is maintained. Applicant's response and arguments filed on 09/24/2007 have been fully considered but they are not persuasive.

At page 14 of the response, Applicant argues that no reference discloses, teaches, or suggests a method of screening a compound or its salt that regulates the glucose uptake activity of a Na+/glucose (SGLT) homolog in the small intestine, and thus the present invention is novel and would not be obvious over the cited references.

Applicant's claim amendments have been fully considered but are not found persuasive. Iwamoto et al., (2002) teach a method of screening a compound regulating glucose uptake activity using the homolog (page 36, lines 19-29) comprising SEQ ID NO:1 (abstract page 1 and page 1 of sequence listing), which has 100% homology with SEQ ID NO:1 of instant application.

In addition, Iwamoto et al. (2002) teach a method of screening for the compound comprising comparing (i) glucose uptake activity in cells having the ability of producing the protein and (ii) glucose uptake activity in cells having the ability of producing the protein in the presence of the test compound (page 36, lines 15-30). These teachings meet the limitations of claim 22.

Finally, Iwamoto et al. (2002) teach that the glucose activity of the method is determined by measuring radioactivity of the intracellular accumulation of [3H]-labeled glucose or glucose analogs, such as 2-deoxy-glucose (page 36, lines 23-30) meeting the limitations of claim 49.

Claim 22 is rejected under 35 U.S.C. 102(b) as being anticipated by Thornton et al. (WO 01/92304 A2; priority to the publication date of May 25, 2001).

As disclosed in the previous Office action, Thornton et al., (2001) teach a method of screening a compound regulating glucose uptake activity using the homolog (page 16, lines 1-9). In addition, Thornton et al (2001) recite that the method of screening a compound comprises SEQ ID NO:20 (page 16, line 3 and page 31 of sequence listing), which has 97.6% homology with SEQ ID NO:1 of the instant application (see alignment in Exhibit C of the previous Office Action of June 29, 2007) meeting the limitations of claim 22. It is noted that the Examiner has interpreted the phrase "an amino acid sequence having at least about 90% homology to the amino acid sequence represented by SEQ ID NO: 1" in the instant claims as reading upon variants, derivatives, and fragments of a SGLT homolog of the amino acid sequence of SEQ ID NO:1.

Finally, Thornton et al. teach that the method comprises combining the polypeptide with at least one test compound under conditions permissive for the activity of the polypeptide, b) assessing the activity of the polypeptide in the presence of the test compound, and c) comparing the activity of the polypeptide in the presence of the test compound with the activity of the polypeptide in the absence of the test compound, wherein a change in the activity of the polypeptide in the presence of the test compound is indicative of a compound that modulates the activity of the polypeptide (page 17, lines 10-15). The teachings by Thornton et al. meet the limitations of claim 22.

Conclusion

No claim is allowed.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ian Dang whose telephone number is (571) 272-5014. The examiner can normally be reached on Monday-Friday from 9am to 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Manjunath Rao can be reached on (571) 272-0939. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Ian Dang
Patent Examiner
Art Unit 1647
December 5, 2007

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Primary Examiner, Art Unit 1647